

WHAT IS CLAIMED IS:

1. A system including:
an implantable medical device, the implantable medical device including:
a far-field radio-frequency (RF) first telemetry circuit;
a power connection module, coupled to the first telemetry circuit, to connect/disconnect power to at least a portion of the first telemetry circuit; and
a wireless signal detector, coupled to the power connection module, to control a conductivity state of the power connection module upon detecting at least one of:
a predetermined wireless signal;
a demodulated or decoded predetermined wireless signal; and
a magnetic field present near the implantable medical device.
2. The system of claim 1, in which the implantable medical device includes an implantable cardiac rhythm management device, and the first telemetry circuit provides at least a six-foot telemetry range.
3. The system of claim 1, in which the wireless signal detector includes a near-field inductive second telemetry circuit.
4. The system of claim 3, in which the second telemetry circuit includes a receiver adapted to receive the predetermined wireless signal, and in which the predetermined wireless signal includes a command for changing the conductivity state of the power connection module.
5. The system of claim 3, in which the second telemetry circuit includes a receiver adapted to detect a magnetic field having a predetermined frequency and to change the conductivity state of the power connection module when the magnetic field is detected.

6. The system of claim 3, in which the second telemetry circuit includes a receiver adapted to detect a near-field inductive telemetry communication and to change the conductivity state of the power connection module when the near-field inductive telemetry communication is detected.

7. The system of claim 3, further including:

a first remote device, electromagnetically coupled to the first telemetry circuit, the first remote device including a far-field RF third telemetry circuit to provide communication with the implantable medical device for at least a six-foot range; and

a second remote device, magnetically coupled to the second telemetry circuit, the second remote device including a near-field inductive fourth telemetry circuit to provide near-field communication with the implantable medical device.

8. The system of claim 7, in which the first and second remote devices are physically integrated.

9. The system of claim 1, in which the wireless signal detector includes a low power radio detector adapted to detect a predetermined telemetry activation signal.

10. The system of claim 9, in which the predetermined telemetry activation signal includes an RF burst and a digital key adapted to identify a particular implantable medical device.

11. The system of claim 9, further including a remote device including a telemetry activation signal generator configured to be electromagnetically coupled to the low power radio detector.

12. The system of claim 1, in which the wireless signal detector includes a magnetic field detector adapted to detect a magnetic field having a magnetic field strength that

exceeds a predetermined threshold.

13. The system of claim 12, further including a magnetic field provider separate from the implantable medical device.

14. The system of claim 13, in which the magnetic field provider includes at least one of a magnet and a battery powered portable magnetic field provider.

15. The system of claim 1, further including a remote device far-field RF second telemetry circuit, electromagnetically coupled to the first telemetry circuit, to provide long-range communications with the implantable medical device.

16. A system including:

an implantable medical device, the implantable medical device including:

a far-field radio-frequency (RF) first telemetry circuit;

a power connection module, coupled to the first telemetry circuit, to connect/disconnect power to at least a portion of the first telemetry circuit; and

an activity sensor, coupled to the power connection module, to control a conductivity state of the power connection module.

17. The system of claim 16, in which the implantable medical device includes an implantable cardiac rhythm management device, and the first telemetry circuit provides at least a six-foot telemetry range.

18. The system of claim 16, in which the activity sensor includes an accelerometer.

19. The system of claim 18, further including a pattern recognition module, coupled to the accelerometer, to detect at least one predetermined pattern of acceleration.

20. A system including:

an implantable medical device, the implantable medical device including:

a far-field radio-frequency (RF) first telemetry circuit;

a power connection module, coupled to the first telemetry circuit, to connect/disconnect power to at least a portion of the first telemetry circuit; and

a telemetry activation sensing circuit, coupled to the power connection module, to control a conductivity state of the power connection module upon a detection of a predetermined telemetry activation signal.

21. The system of claim 20, in which the implantable medical device includes an implantable cardiac rhythm management device, and the first telemetry circuit provides at least a six-foot telemetry range.

22. The system of claim 20, further including a cardiac sensing lead, coupled to the telemetry activation sensing circuit, and in which the telemetry activation sensing circuit includes:

an amplifier having an input and an output, the input coupled to the cardiac sensing lead; and

a filter, coupled to the output of the amplifier.

23. The system of claim 20, further including:

a cardiac signal sensing amplifier having an input and output, the output coupled to the telemetry activation sensing circuitry, the telemetry activation sensing circuitry including a filter coupled to the output of the sensing amplifier; and

a cardiac sensing lead, coupled to the input of the cardiac sensing amplifier.

24. The system of claim 20, further including a minute ventilation sensor circuit, coupled to the telemetry activation sensing circuit.

25. The system of claim 20, further including an external interface device adapted to be communicatively coupled to the implantable medical device, the external interface device including an electrical current generator adapted to introduce an electrical current into a body to be received by the telemetry activation sensing circuit to connect power to at least a portion of the first telemetry circuit.

26. The system of claim 25, in which the external device further includes a surface electrocardiograph (ECG) electrode to introduce the electrical current into the body.

27. The system of claim 25, in which the external device further includes at least two conductive surfaces, coupled to the electrical current generator, to introduce the electrical current into the body through contacts between the metal surfaces and the body.

28. A system including:

an implantable medical device, the implantable medical device including:

a far-field radio-frequency (RF) first telemetry circuit;

a power connection module, coupled to the first telemetry circuit, to connect/disconnect power to at least a portion of the first telemetry circuit; and

a timer, coupled to the power connection module, to change a conductivity state of the power connection module after waiting a predetermined period of time after the first telemetry circuit enters a predetermined state that includes at least one of a data transmission idle state and a telemetry establishment failure state.

29. The system of claim 28, in which the implantable medical device includes an implantable cardiac rhythm management device, and the first telemetry circuit provides at least a six-foot telemetry range.

30. A method including:

connecting at least one portion of a far-field radio-frequency (RF) first telemetry circuit in an implantable medical device to an energy source through a power connection module;

detecting a predetermined wireless signal; and

changing a conductivity state of the power connection module when the predetermined wireless signal is detected to couple or decouple power to the at least one portion of the first telemetry circuit.

31. The method of claim 30, in which the implantable medical device includes an implantable cardiac rhythm management device, and the first telemetry circuit provides at least a six-foot telemetry range.

32. The method of claim 30, in which detecting the predetermined wireless signal including detecting a near-field inductive predetermined wireless signal.

33. The method of claim 32, in which the predetermined wireless signal includes a magnetic signal having a predetermined frequency.

34. The method of claim 32, in which the predetermined signal includes a code initiating communication activity of the first near-field inductive telemetry circuit.

35. The method of claim 32, in which the predetermined wireless signal includes a command code, the command code including a command for changing the conductivity state of the power connection module.

36. The method of claim 30, in which the predetermined wireless signal includes an RF burst signal, and changing the conductivity state of the power connection module includes connecting power to the at least one portion of the first telemetry circuit.

37. The method of claim 30, in which the predetermined wireless signal includes a termination code, and changing the conductivity state of the power connection module includes disconnecting power to the at least one portion of the first telemetry circuit.

38. The method of claim 30, in which the predetermined wireless signal includes a magnetic field strength signal, and changing the conductivity state of the power connection module when the predetermined wireless signal is detected includes changing the conductivity state of the power connection module when the strength of the magnetic field exceeds a predetermined threshold for at least a predetermined period of time.

39. A method including:

connecting a first far-field radio-frequency (RF) telemetry circuit in an implantable medical device to an energy source through a power connection module;
monitoring an activity level; and
changing a conductivity state of the power connection module when the activity level exceeds a predetermined threshold.

40. The method of claim 39, in which the implantable medical device includes an implantable cardiac rhythm management device, and the first telemetry circuit provides at least a six-foot telemetry range.

41. The method of claim 39, in which monitoring the activity level includes monitoring an acceleration.

42. The method of claim 41, in which monitoring the acceleration includes monitoring a predetermined pattern of the acceleration.

43. A method including:

connecting at least one portion of a far-field radio-frequency (RF) first telemetry circuit in an implantable medical device to an energy source through a power connection module;

introducing a predetermined electrical current signal into a body;

detecting the predetermined electrical current signal introduced into the body; and

changing a conductivity state of the power connection module when the predetermined electrical current signal is detected.

44. The method of claim 43, in which the implantable medical device includes an implantable cardiac rhythm management device, and the first telemetry circuit provides at least a six-foot telemetry range.

45. The method of claim 43, in which introducing the predetermined electrical current signal into the body is carried out through a plurality of surface electrocardiograph (ECG) electrodes.

46. The method of claim 43, in which introducing the predetermined electrical current signal into the body is carried out through a plurality of conductive contacts of an external device.

47. The method of claim 43, in which the electrical current signal is an approximately sinusoidal signal having a frequency of about 30 kilohertz.

48. A method including:

connecting at least one portion of a far-field radio-frequency (RF) first telemetry circuit in an implantable medical device to an energy source through a power connection module;

monitoring data transmission activity of the first telemetry circuit; and

changing a conductivity state of the power connection module to disconnect power to the at least one portion of the first telemetry circuit when the first telemetry circuit exists in an idle state for a predetermined period of time.

49. The method of claim 48, in which the implantable medical device includes an implantable cardiac rhythm management device, and the first telemetry circuit provides at least a six-foot telemetry range.

50. A method including:

connecting at least one portion of a far-field radio-frequency (RF) first telemetry circuit in an implantable medical device to an energy source through a power connection module;

changing a conductivity state of the power connection module to connect power to the at least one portion of the first telemetry circuit;

attempting to establish communication between the first RF telemetry circuit and an external device; and

if the attempt to establish communication fails:

changing the conductivity state of the power connection module to disconnect power to the at least one portion of the first telemetry circuit; and

repeating the attempt to establish the communication after waiting for a predetermined period of time.

51. The method of claim 50, in which the implantable medical device includes an implantable cardiac rhythm management device, and the first telemetry circuit provides at least a six-foot telemetry range.

52. A method including:

connecting at least one portion of a far-field radio-frequency (RF) first telemetry circuit in an implantable medical device to an energy source through a power connection module;

detecting a predetermined first telemetry activation signal;

changing a conductivity state of the power connection module when the first telemetry activation signal is detected to connect power to the at least one portion of the first telemetry circuit;

detecting a predetermined second telemetry activation signal; and

starting data transmission using the first telemetry circuit when the second telemetry activation signal is detected.

53. The method of claim 52, in which the first telemetry activation signal includes at least one of:

a predetermined wireless RF signal;

a demodulated or decoded predetermined RF wireless signal;

a magnetic field present near the implantable medical device;

an activity signal; and

an electrical current signal introduced into a body.

54. The method of claim 53, further including sending the second telemetry activation signal from a remote device at a predetermined frequency.

55. The method of claim 54, in which the second telemetry activation signal including a digital key adapted to identify a particular implantable medical device.